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Timothy—A Famous and Not to Be Forgotten Tortoise

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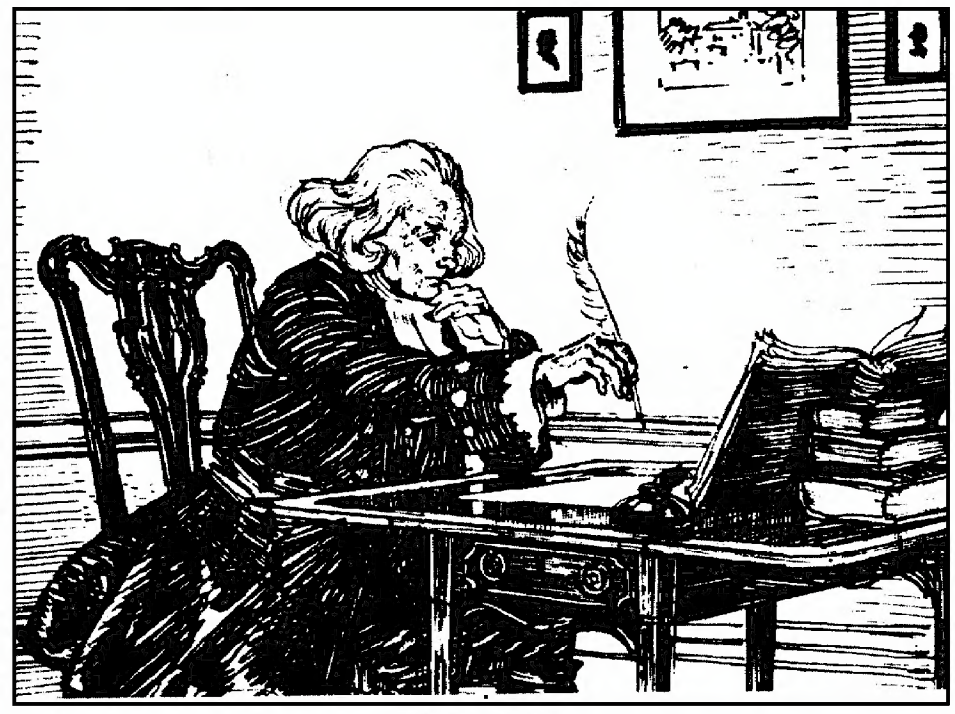
Timothy died in 1794, outliving his owner by one year. Eventually his carapace found its way into the hands of Mrs. Christopher, and she presented it to the British Museum of Natural History on 17 April 1853. From its shell it was first believed that Timothy was *Testudo graeca ibera*, a race of the Greek tortoise indigenous to a small area between the Black and Mediterranean seas. We also know from the shell that Timothy was a female. In 1836 the Algerian population of Greek tortoises was named as a distinct species, *Testudo whitei*. The name was short-lived. Subsequently, based in part on Timothy's shell, the specific name was resurrected and placed in the genus *Furculachelys* in 1989. This proposed taxonomy, however, has not been accepted by the systematic community, and more importantly, locality data for Timothy is not available. We know much about Timothy himself through the detailed journals of Gilbert White, Mrs. Christopher's great uncle.



Gilbert White

The setting is English—eighteenth century Hampshire. It is the first accounting of a captive tortoise, a story that figures strongly in the birth of natural science and the English tradition of amateur natural history study.

The importance of Timothy and the other subjects of Gilbert White's journals are easily overlooked in our present-day media-enriched culture. Although the natural sciences have now become much more advanced, White's journals still have biological merit. White was the first English-language writer of natural history and his writings deserve the same level of recognition as those of Thoreau, Audubon and Darwin. It can even be argued that his writings provided the foundation for the appreciation these three had of the natural world. The civilized world had barely emerged from mythology, alchemy, witchcraft and sorcery when White first began his journals. The few scholars of the time who were elevated above pastoral logic became occupied with anatomical descriptions, or the system of taxonomic classification, both of which, in White's time, were in their infancy. Serious sundry sciences of genetics, behavior, and evolution had not yet begun. Objects were kept in cabinets as curiosities and natural science advanced from indoor studies and academic presentations to learned colleagues. White was the first to write and publish first-hand natural history accounts; he wrote of simple everyday things—changing seasons, hedgehogs and hedgerows, a horse surviving a lightning strike, and of Timothy coming out of hibernation in his Selborne garden.

White's *The Natural History and Antiquities of Selborne*, first published in 1798, still stands as a landmark in scientific writing. And his journals (*Gilbert White's Journals*; edited by Walter Johnson, and not published until 1931 by George Routledge & Sons, London) have been labeled by many as the solitary English literature classic in natural history. From these two books we know quite a lot about Timothy. While some of the information is quite specific ("on August 20, 1776," a month and a half after the signing of the American Decoration of Independence, "Timothy weighed 6 lbs. 14½ oz."), most of it is enjoyable for its simple charm ("it was a reptile that appears to relish longevity so little as to squander more than two-thirds of its existence in a joyless stupor").

In the tradition of the time White learned to hunt and shoot, and it was probably during this period in his youth that he began to appreciate the natural world for its own sake. His roots ran deep in soil of the English country side and his appreciation of home sparks warm feelings and loyalties, which endear him to his readers. White was apparently unconcerned about the events of his day. The British conquest of India and Canada, the Jacobite Rebellion, and the French and American Revolutions are never even mentioned in his journals. Gilbert White, a country gentleman, was by profession a clergyman who rarely left his home. His nephew John later described him as a "man of quiet intelligence and enviable contentment." Although White was religious, his natural history writing was straightforward and objective and not influenced by the contemporaneous religious concepts that dominated the popular nature writing of the time. Several of his publications were quite technical; for example, he discovered and named the harvest mouse of England.

Gilbert White saw nature through self-trained eyes and recorded his observations about the world with objectivity and artistry difficult to duplicate. He had a sensitive poetic emphasis that today would seem trite to most. His works appear to be unrelated to his Oxford education. His nature writing officially started at the age of 47 when he wrote his first letter to Thomas Pennant, Esquire, a fellow in the Royal Society of London and author of THE textbook on British zoology. White's book on the natural history of Selborne is simply an

assemblage of such letters, each addressing a number of interesting subjects. The recipients of these letters were all famous scholars of the day, but in every case they would have been forgotten were it not for their acquaintance with White. For the most part the letters were not actually mailed correspondence; they were a literary vehicle through which White expressed his thoughts.

Despite not being published until 138 years after his death, White's private journals were the foundation of the letters in *The Natural History of Selborne*. The journals were sort of a garden calendar he started in 1751. His original journal consists of more than 10,000 chronological undigested entries. *The Natural History of Selborne* became immortal on the English speaking eastern side of the Atlantic and there seems to be almost as many editions of this book as there are years since Gilbert White's death. This is not an exaggeration, the book was an instant success and between 1789 and 1901 it went through 90 editions in the British Isles alone. Perhaps the secret of the book's value is found in the author's own words, "Men that undertake only one district are much more likely to advance natural knowledge than those that grasp at more than they can possibly be acquainted with: every kingdom, every province, should have its own monographer." Like his grandfather, also named Gilbert White, White was born and died at Selborne—a place immortalized by a single book.

We learn from White a fair amount about Greek tortoises, at least captive ones which are allowed the run of English gardens. The information is what every tortoise hobbyist learns for themselves, but White took the time to write it down nearly 200 years before anyone else was taking note of such things. We know Timothy's daily routine, how he reacts to rain, his favorite foods, and of different hibernation sites he used over the 17 years he was in White's possession.

It was Timothy's hibernation that most fascinated Gilbert White. In the late 1700s natural history knowledge was still overshadowed by medieval beliefs. Swallows, for example, simply disappeared during the winter and whether they migrated to some unknown place or hibernated locally was still a matter of heated academic debate. It would be a hundred years after White's death before it was definitely established that house swallows wintered in South Africa. Shakespeare, along with most English academics, believed swifts, swallows and martins hibernated in underground burrows for the winter. Others wrote that their hibernation was "like that of geese"—underwater. The few supporting the concept of long distance migration were regarded as very out-of-date. This discussion of swallow hibernation seems absurd to us now, but White was perplexed by individual birds that appeared early in the spring and others that delayed their departure well into the fall. He personally believed that migration was the logical answer, but all evidence suggested otherwise. White suspected that careful observations of the patterns of hibernation, and the periodic emergence of Timothy, would in some way shed light on the habits of swallows. For example, compelling, but erroneous, evidence of swallow hibernation was perpetuated in late March of 1777 when White's aunt reported that on the same day Timothy emerged from hibernation many house swallows had appeared. White never did get to the answer, but the key point is that while noted scholars debated academic issues from desks in their libraries, White attempted to learn natural history directly from personal observation. From the perspective of the period this concept was as revolutionary as the radical political ideas simultaneously developing in France and America. It is hard for those of us living in the late twentieth century to regard observation and objectivity in science as the pioneering rebellious concept that it was.

Prior to White acquiring the tortoise, Timothy had lived for 30 years in Sussex in a little walled-in court belonging to Mrs. Rebecca Snooke, White's widowed aunt. White's first mention of Timothy was in the close of a "letter" to Daines Barrington, another member of the Royal Society. The letter was written on 8 October 1770, when White was 50, Mrs. Snooke was 76, and Timothy was believed by his owner to be in his 40th year. (Well it was really *her* 40th year—we also can see from Timothy's shell that he was a she.) If the reported age of Timothy was correct he lived to be sixty four, not an unreasonable age for a tortoise. However, the actual age of Timothy appears to be only speculation and in that he was full-grown (at least his weight did not increase any between 1775 and 1794) by the time White first encountered him, it is likely that he was even older. Gilbert White referred to him as "so old a domestic, who behaved himself in so blameless a manner in the family for nearly fifty years." The tortoise had originally been acquired by Mrs. Snooke about 1740 when she visited Chichester and purchased a "Mediterranean Tortoise" from a sailor for half a crown. As far as I can tell this is the first documented instance of what would one day grow into a massive international commercial trafficking of Greek tortoises. By the late 1960s as many as 300,000 Greek tortoises were being exported each year from Morocco to Great Britain.

The ages of other Greek tortoises kept in European gardens during this same general period are poorly documented and available information is contradictory. Archbishop Laud had a tortoise whose shell still resides in Lambeth Palace. The tortoise was released in the garden at an unknown age in 1633 by Laud and two different labels on the existing shell place its death at 1730 (97 years) and 1753 (120 years). Another individual kept by the Bishop of Peterborough was reported to have lived 220 years, but records with the specimen show that it either lived from 1757 to 1819 (62 years) or from 1747 to 1839 (92 years). The problem, of course, is that the tortoises all seem to outlive the people keeping the records. The oldest known Greek tortoise (at least one for which the authenticity is not in question), at 149 years is still alive. It hatched as a captive in Britain in 1850, and served on various HMS vessels and in two World Wars before retiring to a castle in Devon. For the last 40 years this tortoise's awakening from hibernation has been a ritual with emergence dates published in British newspapers.

Mrs. Snooke died at the age of 86 and after her funeral White dug Timothy out of his March hibernation and they both returned to Selborne. And while their is no doubt that Timothy was acquired as an accessory to White's interest in swallows, soon after the tortoise took up residence in Selborne (1780)

White's journals began to reveal that the tortoise had a personality of its own. Timothy was clearly a key character in the Selborne journals (he is indexed more often than any other entry), and a century and a half later Sylvia Warner extracted all mention of him from what White had written about the tortoise, and compiled a book just about Timothy (1946. *The Portrait of a Tortoise*. Avon Books, New York.)

It is interesting to note that Rebecca Snooke's purchase of Timothy came eight years prior to Linnaeus' description of the species and the genus *Testudo* (1758. Syst. Nat., ed. 10, 1: 197-198). Timothy the tortoise may have even been wandering about some place like Romania or Algeria at the time of Linnaeus' birth. White himself, a contemporary of Linnaeus, asked his colleagues in the Royal Academy to pass on the fact that he had personally studied empty tortoise shells in Mrs. Snooke's collection, and that several had hinged plastrons suggesting that this might be a way in which Linnaeus could distinguish additional species.

Timothy was observed, weighed, and called to loudly through a speaking-trumpet to see if he could hear. His droppings were examined, his swimming ability tested, his daily routine studied, and his food preferences were noted. "1781. Feb. 11. The tortoise came-forth & continued to be alert 'till the 25th, & then eat some lettuce; when the weather turning very harsh he retired under the straw in his coop." The tortoise had complete run of the garden and was allowed to consume flowers and vegetables at will, showing preference for some varieties while ignoring others. Like nearly all captive tortoises Timothy occasionally escaped and once he was missing for eight days before he was recovered from a nearby field.

Was White's documentation the first detailed natural history study of a tortoise and the initial record of captive husbandry techniques? The answer is, "almost certainly." But more importantly, Timothy, whose immortalized shell resides in the British Museum, is probably by default the first creature to be mentioned in a published, science-based, biological study focused on any live organism. In both *White's Journal* and *Natural History* one can see the author breaking free of the anthropomorphic thinking of the period. Timothy is presented, not as an object through which man can allegorically reexamine his own traits, but as the tortoise that he was. White's Timothy bridges—no, jumps—the gap between sappy nature writing and observation-based natural history. For the first time tortoises and other living things were enjoyed for their own merit and their actual value did not need to be linked to the likeness of man.

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Notes on Reproduction of the Black-striped Snake, *Coniophanes imperialis imperialis*, from Texas

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The black-striped snake has an extensive range in Mexico, but in the U.S. it is found only in the three southernmost counties of Texas. Even though it may be locally common in these counties, and appears to to live around human habitation, little is known of its reproduction. Tennant (1984) reported that one specimen from south Texas laid 4 eggs in May, while another laid 5 eggs in June. Neither clutch hatched, however. Two specimens collected under a board in Brownsville, Texas, and held temporarily, provided a wealth of information which is presented here.

On 16 May, after a heavy rain, a pair of *Coniophanes i. imperialis* was collected under a board in a suburban area of Brownsville. The pair was separated soon afterward and they were housed in separate enclosures. The female shed on 8 June, and laid three smooth, adherent eggs on 23 June. This would suggest a gestation period of at least 37 days. The eggs were laid in pine bark mulch instead of the very moist sphagnum moss present in an egg-laying box. They were transferred to vermiculite for incubation, which was mixed with water at a ratio of slightly less than 1:1 water to vermiculite by weight.

These three eggs measured 3 cm, 3.25 cm and 3.25 cm long by 1 cm wide. Their average weight was 1.3 g, the total clutch weight being 4 g. The female weighed 11 g immediately after laying, which represented a maternal investment of 26% of her body weight. This female measured 40.6 cm (16 in) in total length, and 29.2 cm (11.5 in) in snout–vent length (SVL).

At incubation temperatures ranging from 25 to 30°C (77–86°F), but averaging around 26.6°C (80°F), the eggs hatched on 15 August, an incubation period of 53 days. The neonates were similar in color and pattern to the adults, except that they were much paler. All three neonates measured 15.2 cm (6 in) total length and 9.9 cm (4.5 in) SVL. There was no sexual dimorphism in the length of the tails; however the one male did have a markedly thicker tail than either female, and his sex was verified using the "popping" technique.

It was interesting to note that the babies displayed the characteristic "tail-waving" display seen in the adults of this species, and they all had remarkably long tails relative to the length of their body. The neonates weighed 1.3 g each.

We would like to thank Texas Parks and Wildlife for granting us a permit to conduct this research

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Mortality of Amphibians as a Consequence of Mineral Fertilizing[1]

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Translated from the German by Bill Leja[2]

Abstract

Mortalities of amphibians were observed on several occasions in 1994 in the course of ecological field investigations of amphibian populations at agricultural sites near Berlin. These deaths resulted from the use of mineral fertilizers. The fertilizers that had been applied were: 1) calcium ammonium nitrate (a nitrogenous fertilizer); 2) a mixture of calcium ammonium nitrate and compounds of phosphorus and potassium; or 3) a mixture containing only compounds of phosphorus and potassium. In agricultural landscapes with important breeding sites a buffer zone of grassland should be created around the water body and the proportion of grassland in the overall area should be increased.

1. Introduction

Hazards to amphibians from agricultural chemicals, particularly the toxic effects of pesticides, have been reported. Overviews have been written by Honegger (1981), Harfenist et al. (1989) and Tester (1990). The extent to which amphibian populations are affected by these hazards is difficult to assess at this time, however. There have been few previous observations and no systematic research, such as is available with fish (Henle and Streit, 1990). Discussions of the negative effects of fertilizing of farm fields have been almost exclusively concerned with eutrophication of breeding ponds (Tester, 1990; Grosse, 1994). Other effects on ponds are acceleration of the pond filling process, transitory high pH values, and enrichment of toxic ammonia compounds. Recently a direct effect of synthetic fertilizers on amphibians has been reported (Wolf, 1993). Consequently, amphibian mortality resulting from direct contact with fertilizer in intensively farmed fields needs to be investigated.

2. Methods and Research Sites

Drift fences with pitfall trap lines were set up to capture migrating amphibians in the course of ecological field studies of amphibian populations in various agricultural landscapes north of Berlin from March to May and from August to October of 1994. The pitfall traps were checked daily in the morning and evening hours. The research was conducted on a farm field on the Barnim Plateau immediately east of Bernau (Brandenburg) and a field in Uckermark northeast of Angermünde (Brandenburg). Both areas are underlain by ground moraines associated with the Brandenburg Stage (Barnim) and the Pomeranian Stage (Uckermark) of the Weichsel Glaciation. The relatively numerous field ponds (10–20/km^2), which are characteristic of the region, serve as breeding sites and habitat for native amphibian populations.

3. Results

The farm fields in the research area, crossed by amphibians migrating to or from breeding ponds, are fertilized in the spring and fall. A field in Uckermark, planted in winter wheat, was fertilized in the spring with nitrogenous fertilizer [calcium ammonium nitrate] at 80 kg/ha (Figure 1). The winter rape

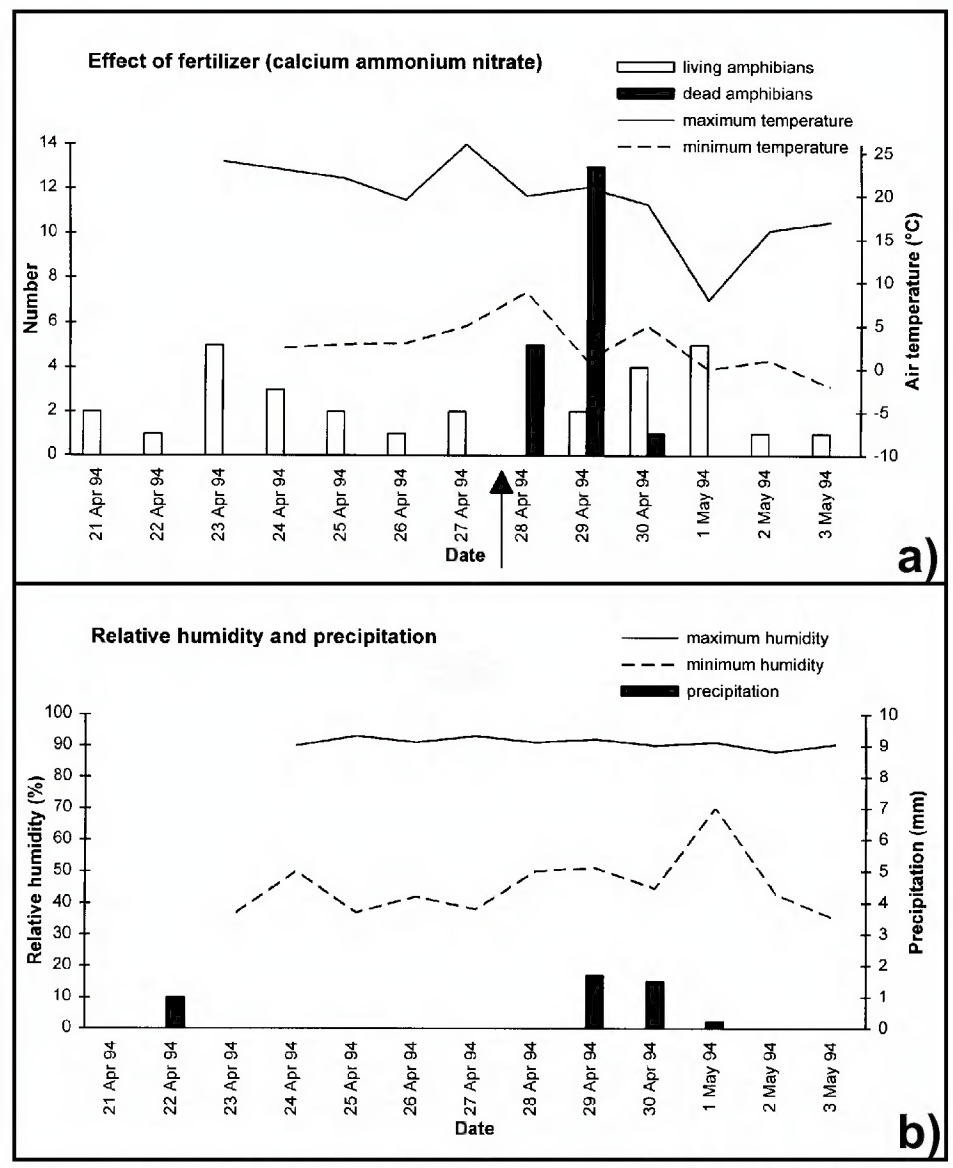

Figure 1. Amphibians caught in a drift-fence pitfall trap line and the corresponding climate curves in Uckermark. Arrow: Application of nitrogenous fertilizer.

1. Citation of original article: Schneeweiss, N., and U. Schneeweiss. 1997. Amphibienverluste infolge mineralischer Düngung auf Agrarflächen. Salamandra 33:1-8.

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crop in Barnim was fertilized on 20 September 1994 (Figure 2). The mineral fertilizer used there contained 10% nitrogen, 11% phosphorus and 23% potash. Nitrogen was also applied in the form of calcium ammonium nitrate, a sharply caustic material. The application rate of nitrogen was 44 kg/ha. This corresponds to 163 kg/ha of calcium ammonium nitrate. Since 100 granules of this nitrogenous fertilizer weigh 4.45 g, the application rate was 3.7 fertilizer granules/dm^2. A field in Uckermark in winter barley was fertilized on 28 September 1994 (Figure 3). In this case, according to the farmer, 50 kg/ha of potash and 100 kg/ha of phosphate was applied as a mixture. The capture apparatus had to be dismantled on 29 September 1994. [This was earlier than planned, but was necessary so that the farmer could cultivate the fields.] As a result, the effect of the fertilizing could be observed only on the day following fertilization.

In all three cases immediately after fertilizing—that is, on the same day and on the following days—up to 100% of the amphibians found in the pitfall traps were dead or severely injured (Figures 1, 2b, 3). This apparently was a consequence of burns from the caustic materials (Figures 4a, 4b). The number of dead individuals of each species after the fall fertilization in Barnim are presented in Table 1. Although the limited data are scarcely sufficient to permit generalizations, it appears definite that newts are particularly affected.

Table 1. Number of specimens found of each species, number that were dead, and percent that were dead, after fertilization of a field at the study site from 21 September to 26 October 1994 (Compare with Figures 2b and 2c).

Species	Total number	Number dead	% dead
Bombina bombina	15	3	20
Bufo bufo	8	2	25
Bufo viridis	5	3	60
Pelobates fuscus	16	3	19
Rana arvalis	41	7	17
Rana esculenta	18	1	6
Triturus cristatus	8	5	63
Triturus vulgaris	18	11	61

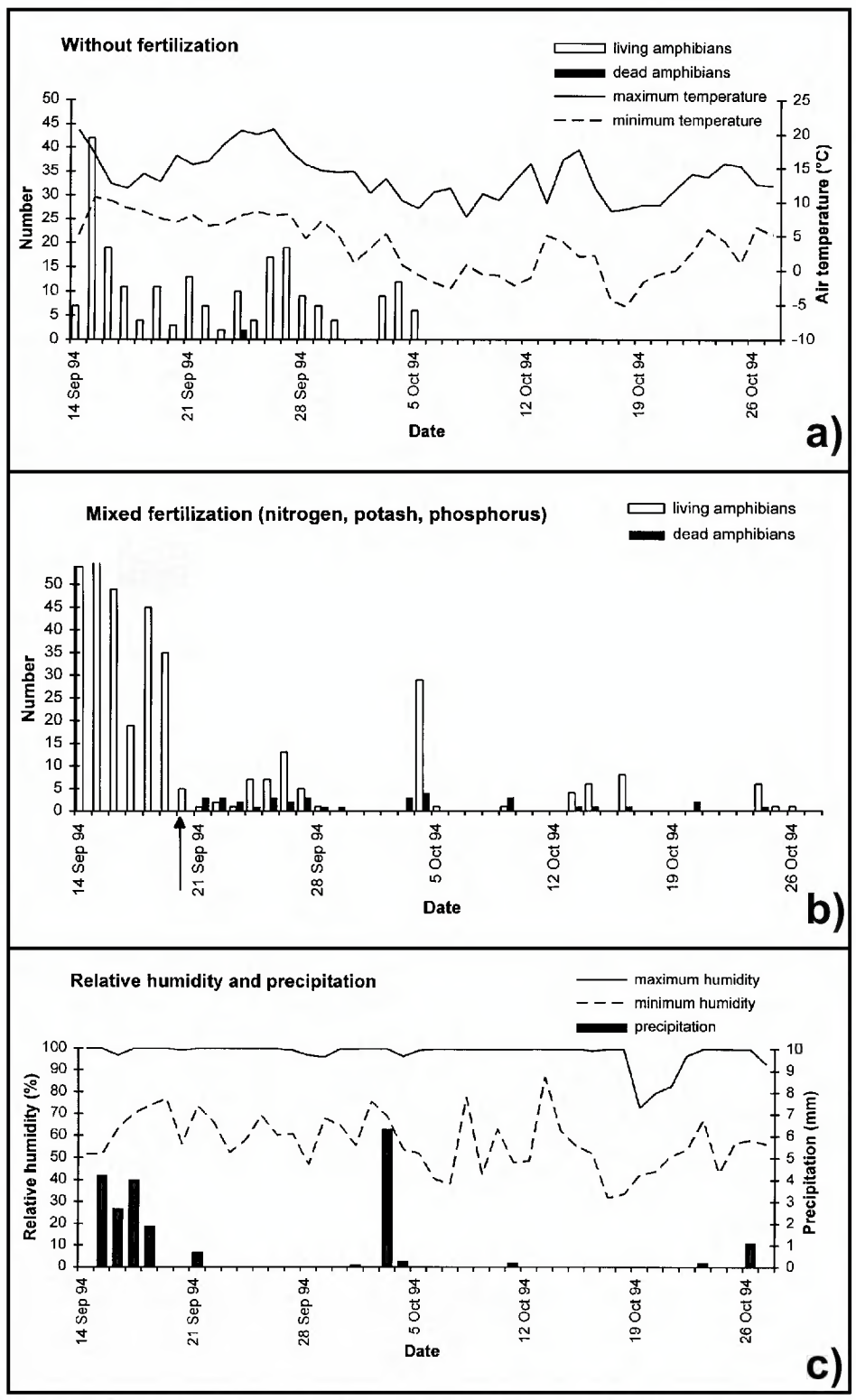

Figure 2. Amphibians caught in two drift-fence pitfall trap lines near Bernau and the corresponding climate curves. **a)** Amphibians caught in the pond "Lindwerder" on untreated, fallow land. **b)** Amphibians caught and individuals foumd dead on a fertilized field. Arrow: Fertilization with nitrogen, potash and phosphorus. **c)** Precipitation and relative humidity (10 cm above ground).

The continuing presence of the fertilizer granules during a long dry period in the fall of 1994 (Figure 2c) proved to be detrimental: Dead amphibians were still being found in the pitfall traps after five weeks (Figure 2b). The onset of precipitation, which dissolves the granules and carries the fertilizer into the ground, was usually correlated with increased amphibian activity on the treated soil. In these situations, for example on 29 April 1994 in Figure 1, higher losses resulted.

A comparison of the numbers of captured and dead individuals between a fertilized field and an untreated section of fallow ground can be made with the fall observations at Bernau (Figures 2a, 2b). In contrast to the numerous dead individuals on the fertilized fields there were no dead or injured amphibians found during simultaneous monitoring of the drift fences at the fallow area; with the exception of a single animal (Figure 2a).

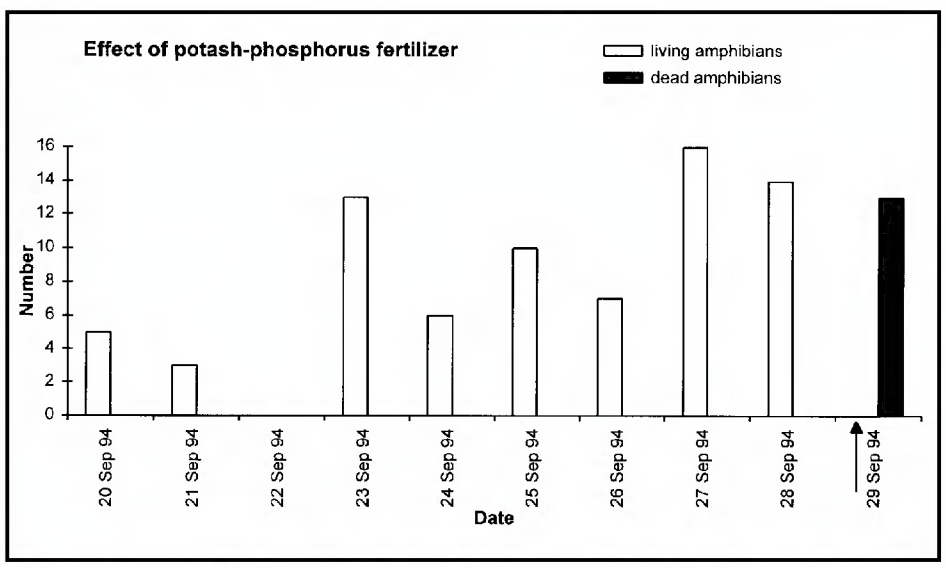

Figure 3. Amphibians caught in pitfall traps in the Uckermark. Arrow: Application of potash–phosphorus fertilizer.

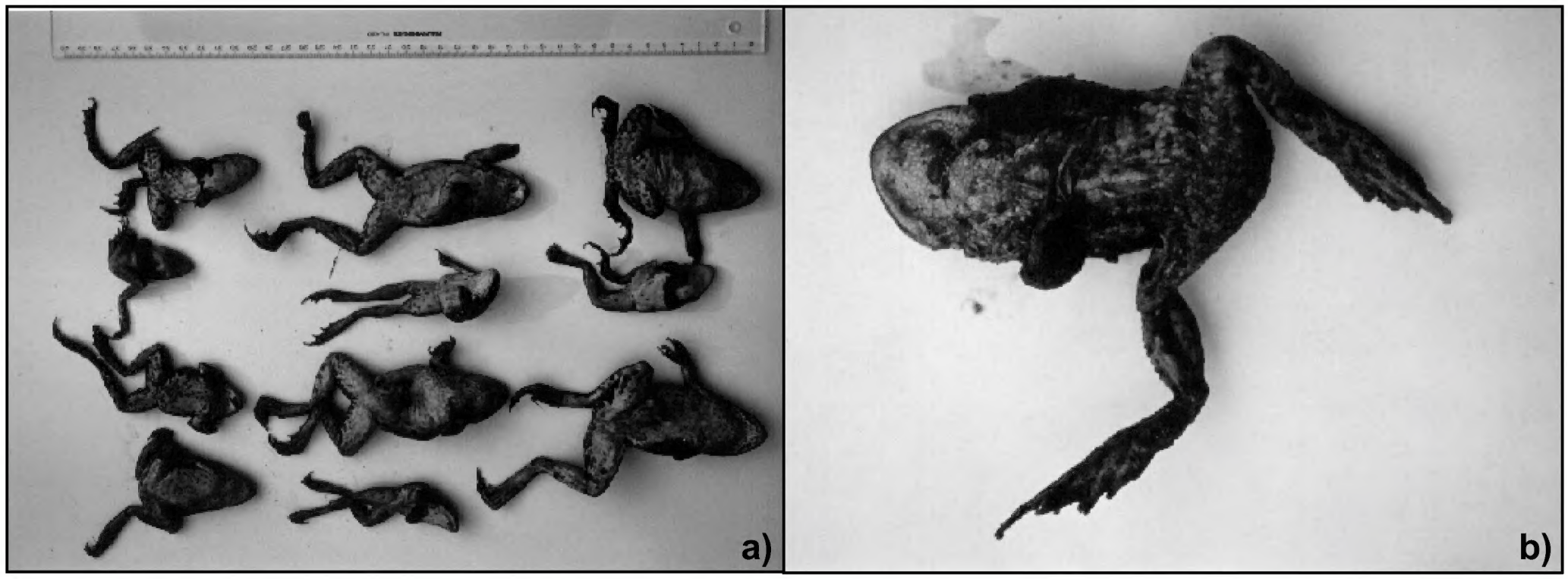

Figure 4. Dead individuals of *Rana esculenta* (**a**) and *Bufo bufo* (**b**), which were found in a drift-fence pitfall trap line after mineral fertilization (nitrogen, phosphorus and potash) of a field.

4. Discussion

and A relationship exists between the use of an amphibian (Figure 1). In one case amphibian mortality also occurred after fertilization with phosphorus and potash (Figure 3). Furthermore, Wolf (1993) likewise described finding dead amphibians (*Bufo bufo*) after use of granular nitrogen fertilizer. A few granules of nitrogen fertilizer discovered on the bottoms of pitfall traps possibly had caused or accelerated mortality. Since our pitfall traps were thoroughly cleaned after the first occurrence of deaths, this circumstance affected our observations only on the first day after fertilizer application. H. Richter (pers. com.) observed the rapid elimination of a common frog (*Rana temporaria*) population near Dresden in the late 1960s following intensive fertilization of meadowlands. Numerous dead animals with definite caustic burns were also discovered at that time.

The relatively small number of reported losses in this investigation can probably be attributed entirely to the following circumstances:

1. Fertilizer was not applied during the main migration phase, although it likely would have been under different weather conditions or crop requirements.

2. Only relatively low concentrations of fertilizer were applied on the quite nutrient-rich soil of the research area. The above-described fall fertilization of the winter rape crop is generally followed by an application of twice as much fertilizer, of up to 100 kg/ha of nitrogen, in the spring (March/April). In that case the density of granules increases to up to 8/dm^2. This may have quite dramatic consequences for migrating amphibians.

The dead animals in the pitfall traps represent only a fraction of the dead or injured amphibians since others may not have headed in the direction of the drift fence.

Newts may be especially at risk because of their high body surface area to volume ratio. Finally, severe caustic burns resulting from long-continuing direct contact of sensitive skin with hygroscopic fertilizer salts during migration were observed in every case, and may represent the cause of death.

5. Recommendations

Systematic investigation, with a broadening of the scope of inquiry to include different fertilizers or their components, should be considered. However, the current state of knowledge is already sufficient to propose the following recommendations for agricultural landscapes that include important amphibian habitat:

1. Because there is an increased amphibian abundance at the edge of water bodies and wetlands, establish a peripheral buffer zone of at least 50 m. Intensive farming techniques should be avoided in this zone. (Cessation of intensive farming within the zone is also urgently needed in order to protect the water body.)

2. Increase the portion of extensively utilized meadowland in agricultural landscapes with important amphibian breeding sites. [The author defines extensively utilized meadowland as meadowland that can be lightly grazed or mowed, but not plowed; and in which no fertilizers or pesticides are used.]

3. Consult with conservation experts at the site before addition of fertilizer in the spring and in late summer or fall. That should prevent or limit the use of fertilizers, which endangers the amphibians during the main migration periods and in migration corridors.

4. Substitute strongly caustic fertilizers or their components with less dangerous substances. Develop alternative methods of superficial or direct application of these substances (for example, Plantocote fertilizer [Plantocote fertilizer is characterized by a slow rate of dissolution—typically 4–8 months, depending on rainfall]).

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Book Review: *Status and Conservation of Midwestern Amphibians* edited by Michael J. Lannoo 1998. xviii + 507 pp. University of Iowa Press, Iowa City, IA. Hardbound (ISBN 0-87745-631-3) $49.95. Softbound (ISBN 0-87745-632-1) $29.95.

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It's rather startling to realize that the global crisis of declining amphibians has been apparent to the scientist and layman alike for only about a decade. Herpetologists have been concerned about habitat destruction, pollution, and other threats to many species for far longer than that, of course. But our realization that something bigger, more complex, and more widespread was at work has emerged only recently, leading to disturbing reports in the scientific literature (e.g., Barinaga, 1990; Phillips, 1990; Wake, 1991) and soon thereafter in the general media. One result of this widespread concern was the formation in the early 1990s of the Declining Amphibian Populations Task Force (DAPTF) with regional chapters throughout the world.

Status and Conservation of Midwestern Amphibians is a major recent addition to the rapidly growing literature on the amphibian crisis. Much of the research included is based on papers contributed at the 1994-95 meetings of the DAPTF's Central United States Division. The geographic area covered by the book is the American Midwest, including the states of Missouri, Iowa, Illinois, Indiana, Ohio, Minnesota, Wisconsin, and Michigan. In essence, the volume is a progress report for this region: what we know, what we do not know, and what we might do next to address the multi-faceted problems of amphibian conservation.

The book is divided into six major sections that in turn are composed of chapters written by contributing authors. The section on "Landscape Patterns and Biogeography" (five chapters) sets the stage by examining the climatic and geologic factors which shaped the formation of the Midwestern amphibian fauna prior to human arrival. "Species Status" (10 chapters) presents field studies on various species, most state protected, including the Illinois chorus frog, four-toed salamander, and green salamander. "Regional and State Status" (10 chapters) is a state by state review of status, distribution, and population changes for all species within a geographic or politically defined area. "Diseases and Toxins" (four chapters) discusses the susceptibility of amphibians to particular infectious diseases and toxins; also included is a review of that "poster child" of amphibians in peril, the infamous malformed leopard frogs discovered in Minnesota in 1995. "Conservation" (five chapters) considers various problems and resolutions in the protection of amphibian populations threatened by

human activities such as agriculture and development. The last section, "Monitoring and Applications" (six chapters) includes examples of monitoring programs and information useful in the design of an effective program.

Almost 60 pages of cited references are grouped at the back of the book, along with addresses of the contributing authors and an index. The book also includes 23 black-and-white photographs (most of them in the chapter on malformed leopard frogs) and more than 100 maps and line drawings, all professionally done. The contributed papers, which were peer-reviewed, are generally well-written and free of typographical errors.

For me the most impressive of the contributions is the chapter by M. J. Mossman et al. on Wisconsin's long-term frog and toad monitoring program. Initiated in 1981 and expanded to statewide coverage in 1984, the Wisconsin survey was the prototype for the North American Amphibian Monitoring Program (NAAMP) begun about five years ago. The chapter summarizes ten years of data gathering on anuran distribution, population trends, and call phenology and will be an important reference for researchers interested in the problems and payoffs of long-term monitoring programs.

Although the breadth and depth of the information in each chapter is variable, the book as a whole provides an amazingly detailed review of Midwestern amphibians and what is known, suspected, or not understood about their threats and status. Perhaps as important to many potential users of this book is the opportunity to compare and evaluate the methodologies that have been used for surveying Midwestern amphibians. As with a similar volume by Green (1997), the book will likely encourage development of more coordinated and effective efforts to assess the status of amphibians nationally or even globally. For that reason, I highly recommend this volume to any individual (Midwestern or not) interested in amphibian conservation. My hope is that it will stimulate the preparation of comparable "progress reports" for other geographic regions.

For information on ordering this book, go to: <http://www.uiowa.edu/~uipress/lanstacon.htm> or send E-mail to: uipress@uiowa.edu.

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HerPET-POURRI

by Ellin Beltz

Sea turtles swim away

• After the Hong Kong government confiscated the parts and pieces of 16 dead sea turtles from religious establishments last year, they began to pay more attention to endangered sea turtles and local religious groups. Now comes word that the authorities have released one sea turtle which was being kept and venerated on a floating temple dedicated to the sea goddess, Tin Hau. More than 100,000 people visited the temple last year, each patting the turtle and throwing coins into its enclosure for good luck. The man who runs the floating temple said that fishermen caught the turtle as a baby four years ago and donated it to the temple after discovering it had mysterious powers. The man said, "Before a typhoon or bad weather, it would flip its flippers furiously and make us all wet, as if it was warning us not to go to the sea. . . . [It] was given to us to protect us." The Agriculture Department said it had nothing to do with religion, but released the animal in an effort to preserve endangered species. [August 14, 1999: *Charlotte Observer* from Dave Lee, and the Monroe, Louisiana, *News-Star* from Martha Ann Messinger]

• "An ancient sea turtle, nearly half the size of a full grown steer, was rescued near the Verrazano Narrows Bridge in New York Harbor," reports the *Chicago Tribune*. The Coast Guard estimated the turtle weighed about 600 pounds and told the reporter it was probably a century old. The turtle had snagged its fin on a line attached to a lobster cage fixed near the bow of an 800-foot Cyprus-flagged tanker. It was treated and released rather than take it to an aquarium. [August 11, 1999, from Claus R. Sutor]

Venomous snakebites

• He's okay now, but it was very real and very scary for researcher Howard Reinert at the College of New Jersey. He was found unconscious at the bottom of a flight of stairs at school, foaming at the mouth, after having been bitten by one of the venomous snakes on which he does research. It was the cries of his four-year-old daughter that alerted other people in the building that her father was hurt. Police found the snake they assume to be the culprit, neatly tied up in a bag in a bucket in a sink in the lab. They said, "We believe after the snake bit him, he had the presence of mind to tie the bag and put a lid on the bucket," and added that he tried to lock the door, because they found his keys in the lock. [*Philadelphia Inquirer*, September 22, 1999, from Mark Witwer] By E-mail we heard

from Bob Zappalorti that Howard (while totally out of it for two whole days) came to himself and was talking with his family apparently fine after a very traumatic experience.

• A 39-year-old man was bitten by a rattlesnake while he was walking in the woods near Titusville, Florida. He managed to flag down a corrections officer driving by and she put him in the front of her car and called for help. By the time the deputy sheriff arrived, the man was unconscious and his right hand was swollen around a puncture wound between the thumb and the forefinger. He was given antivenin at the parish hospital where doctors said they thought his fast reaction to the toxin may have been the result of the snake hitting a vein during the bite. The man's father said his son had been bitten before. . . . [Orlando, Florida *Sentinel*, August 21, 1999, from Bill Burnett]

• A licensed snake handler in Orlando, Florida, was bitten on the hand by a 10-foot-long black mamba. He took 10 vials of antivenin with him to the emergency room and was considered much improved by the afternoon. What he was doing when he was bitten was not reported. Black mambas are native to Africa. [*Orlando Sentinel*, August 24, 1999, from Bill Burnett]

A mystery we may never understand

The decaying body of a 46-year-old man who had been dead for days was discovered in his New Orleans apartment, "surrounded by dogs and snakes," according to the *News-Star*. The neighbors had noticed a stench, but thought it might be a dead animal or some trash in the yard, but when they went to feed the man's dogs which had been left out, they saw a cloud of flies in the house. Animal control workers had to wear gas masks to take out the dogs and look for loose snakes before the coroner could remove the corpse. All told, seven snakes and a 1½-foot water monitor were found in aquariums or homemade cages. Neighbors told reporters that "the man was an eccentric who stayed aloof from the chummy neighborhood atmosphere, seldom speaking to other residents." The animals were taken to the Audubon Zoo, which will try to find homes for them. [September 6, 1999, from Martha Ann Messinger]

Another decline blamed on chytrid fungus

Colorado state biologists were studying a large die-off of boreal toads when they found that the toads were infected with a species of chytrid fungus. The fungus covers the toad's belly and legs and it is suspected that it suffocates amphibians by making it harder for them to breathe through their skin. A veterinary pathologist at the National Zoo in Washington said, "There is little doubt that this is a worldwide phenomenon." Declining amphibians have worried biologists and even the public because they are perceived to be "canaries" in our global "coal mine." Chytrid fungus has damaged 10 species of frogs and toads in Australia, seven in Panama and six more in American zoos and aquariums. [*Philadelphia Inquirer*, September 12, 1999, from Mark Witwer]

Way to go Travis!

The Kansas Herpetological Society chose Travis W. Taggart as the first recipient of the "Suzanne L. and Joseph T. Collins Award for Excellence in Kansas Herpetology." He received a commemorative plaque and a check for $1,000. The Collins Award is the largest annual biological award in the state and the largest annual award in the U.S. to further research on amphibians and reptiles, according to *FrogLog*. [August 1999, from John Wilkinson]

Don't miss it

Long-time contributor to this column Ray Boldt has—from time to time—sent me beautiful black and white photos of special places in Lake County. Now arrives a copy of an announcement "The Photography of Ray Boldt—Impressions of Ryerson." The show runs November 6 through December 19 at Ryerson Woods Visitors Center in Deerfield. [*Lake County Forest Preserve Newsletter*, September 1999]

Put 'em on the menu!

Some things make no sense. I'm tired of running "we eat snake" stories from Asia. Now comes an even odder story from Hong Kong. "Diners screamed in terror and leaped on tables as snakes suddenly slithered across the floor during lunch in a Chinese restaurant. . . . About 100 customers [were there] . . . when several men, believed to be debt-collectors, released the snakes and some grasshoppers from two bags. . . . Police had to call a snake handler, who rounded up 28 nonpoisonous snakes. One woman was so scared that she had to be carried out weeping on the back of a fellow patron." [August 22, 1999: Baton Rouge *Sunday Advocate* from Ernie Liner and the *News-Star* from Martha Ann Messinger]

Did we need to know this?

Gator farmers used to throw away alligator guts, but no more, something in the guts is important for production of certain perfumes. This is good news since gator meat is down to 50 cents a pound, down from $1.25 a pound last year. Skin prices are up a little to $24 a foot on perfect skins. [*The Courier*, September 4, 1999, from Ernie Liner]

A lucky escape from the jaws of death

A couple was cooling off in a pond behind the Jolly Time Bar in Kissimmee, Florida, when the woman was grabbed and nearly dragged away by a 7-foot alligator. Her boyfriend managed to kick the gator off her and pull her out of the water. The woman had tried to leap away from the gator, but it locked down on her calf. She said, "It felt like a Rottweiler had grabbed me. . . . It started to twist me into the water." [Baton Rouge *Advocate*, September 2, 1999, from Ernie Liner]

Loose, wild and free—but not welcome

• Residents of Reading, Pennsylvania, were more than a little disturbed to find out that a 14-foot, 125 pound pet python had slid out from its cage and was somewhere on the loose on their quiet block of homes. Some people are leaving their cats and dogs inside and being very careful as they walk around their houses. Others question why keeping large snakes is even legal, now that they have now been implicated in human and pet attacks—and some fatalities. The cute little graphic attached to the article pointed out that the missing Burmese is the same length as a brand new Volkswagen Neubeetle! [*Reading Eagle/Reading Times*, August 26, 1999] Remember that it was

only one month before that a family near Washington, D.C. had pulled their little dog, Dusty, from the jaws of a 12-foot snake which they beat and then killed with a .22. [July 29, 1999, *Reading Eagle/Reading Times*, all from Walt Loose]

• Meanwhile, in Indiana, a Plymouth homeowner is very upset after finding a snake in the dirt crawlspace below the family house. A wildlife conservation officer suspects the snake is a python from the size of the slither marks, but he was unable to catch it. The snake was first seen by the daughter of the family after hearing something sliding around in the cellar. She opened the door and saw the snake, holding the limp body of a cat in its jaws. She called the police, who said they could do nothing until the snake turned back up again, so the family called the conservation department. The family said they'd been hearing odd noises but had thought nothing of them until this latest incident. One family member took to sleeping in the car. [*South Bend Tribune*, September 11, 1999, from Garrett Kazmierski]

• Neighbors in a quiet cul-de-sac were up in arms when their kids found a "dragon" on a day trip to Clear Lake. They caught it and found it to be some kind of a "mysterious lizard," and plopped it into a fish tank and took some pictures. They looked in an encyclopedia and decided their catch was a monitor lizard, but then found that the animal had slipped away from the aquarium, knocking aside the recycling bin which had been placed on top. And four kittens disappeared too. [*Orlando Sentinel*, August 8, 1999, from Bill Burnett]

Now we've seen it all

More than a dozen loggerhead sea turtle babies that had wandered the wrong way had been caught by the National Park Service, put in buckets and left for a few minutes while workers when to look for more. While they were gone, someone stole the buckets and dumped the turtles out on the ground. So then they had to go try and catch them again! They were finally all released in the ocean off Pensacola Beach, Florida. [*The Sentinel*, August 19, 1999]

Volusia County gets real

Following a string of losses in court over continuing failure to protect baby sea turtles from light disorientation, Volusia County, Florida, is finally getting serious about enforcing beach lighting. The fines are up to $250 per day or $5,000 for non-compliance with the rules "prohibiting light sources that are directly visible from the beach or indirectly illuminate the beach," according to the *Orlando Sentinel*. The county has sent out 300 letters to property owners whose lights do not comply with the rules. When they got no response, they started writing violations. Some county officials said they'd prefer to see voluntary compliance. It's pretty easy anyway. Just turn off the lights from May 1 to October 31 or redirect them so they don't shine on the beach. Save money, turn off a light, eh? A record 612 nests have been counted; 23 disorientations have occurred. [August 10, 1999, from Bill Burnett]

A giant leap for amphibians

The Detroit Zoo has opened the National Amphibian Conservation Center. The zoo has successfully bred the golden mantella and the Puerto Rican crested toad. This will be the first zoo in history to have a major center for the study and conservation of frogs and toads. The facility cost $6 million to build on its two-acre re-created Michigan wetland site. Visitors stroll wooden walkways and observe native species through spotting scopes as well as look under the surface of a pond at salamanders and frogs swimming around. [*Wildlife Conservation*, August 1999, from Lori King]

Monitors rescued from death trap . . .

Shouts the headline in the Bangalore edition of the *Deccan Herald*, which continues: "the Bangalore Society for the Prevention of Cruelty to Animals (BSPCA) has rescued the monitor lizards recently from being killed for the extraction of oil to be used for medicinal purposes. Monitor lizards, found in the deserts of Rajasthan, are under the threat of extinction. . . . These lizards have an elongated snake-like body which will be about 1½ to 2 feet long having protractive tongue. According to BSPCA president . . . these animals are being killed for oil by about 20 tribal families from Rajasthan. The extracted oil is being used as a curative for diseases like paralysis, arthritis and other joint pains and [is] a lucrative trade. . . . These tribals, in order to immobilize the animal, break its backbone and keep it in captivity without food and water. The oil is extracted from the lizard after putting it into the boiling water. . . . About 150 to 200 ml of oil can be extracted from one lizard. . . . The rescued lizards are kept in the animal shelter of BSPCA and will later be rehabilitated in the Bannerghatta forest area." [July 5, 1999, from Rom Whittaker] Rom points out that while the lizard is strongly protected on paper, magistrates rarely take animal issues seriously and so this sort of thing is—unfortunately—becoming far more common.

A Halloween message to us all

When was the last time you saw a frog, toad, salamander, turtle, snake or lizard in the wild? When was the last time you saw a wild place? Did you know that the population of the Earth surpassed 6 billion humans for the first time ever (that we know about) on October 12 this year? How much time do you think our scaly or smooth friends have in their wild places before those places are no longer wild? What have you done to help them out? Let's individually and collectively start a movement to "plant something wild" in our yards, farms and fields. Let's resolve to let a little bit of nature make it through to the next millennium. Skip the weed whacker; take a child out for a nature walk today. They are our future—and the future of the critters we love the most.

Thanks to all my contributors and to Ray Boldt, Joyce Fox, Garrett Kazmierski, Martha Ann Messinger, Lori King-Nava, one no-name-on-clipping, Ernie Liner, Walt Loose, Eloise Beltz-Decker, John Mason, and Jack Fertig for stuff I enjoyed reading but didn't use in the column. Please send more clippings! The file is almost completely empty and I only have three weeks til the next column! Take whole pages of newspaper with herp articles, put your name on each page and mail to: Ellin Beltz, 1647 N. Clybourn Avenue, Chicago, IL 60614-5507. Check out the CHS home page <www.chicagoherp.org>; send letters only to my E-mail <ebeltz@ripco.com>.

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My C.H.S. Field Trip to the Louisville Zoo: Part 2 – Who's Who at the Zoo?

by Gary Fogel
C.H.S. Treasurer / Cub Reporter

The Louisville skyline loomed up in the distance, which could only mean one thing. It was time for the bus driver to find the zoo without getting lost. Last year, on our trip to the St. Louis zoo, we drove aimlessly for almost an hour before finding the zoo. Would we have a repeat of last year, I wondered? Of course, what *is* a bus trip without having to pull into an industrial park or warehouse district to ask directions from someone who looks like they live in a cardboard refrigerator box year-round? This time was no exception. Along the way we did get to "take in the sights" which I didn't mind as it's always fun to see how people in other places live. We passed a video store that specialized in cult and B-movie films. This absolutely "killed" poor 12-year-old John Kostka, who desperately wanted to stop. (It's a good thing the bus's windows were sealed.) His face pressed up against the glass, angst-ridden John would have wriggled out of the bus's port-a-potty plumbing if he could have figured out how. But this stop was not to be. The mini-director / screenwriter is always on the lookout for cult videos he hasn't yet seen, but in this case, John had to admit defeat!

It took us a good 20 minutes from the time we entered Louisville to actually find the zoo. Upon parking and unloading ourselves, we made our way to the gate. Within minutes, we were greeted by Bill Quatman who took us to an informal luncheon buffet the zoo had prepared for us, at the Islands Pavilion, in one of their classroom areas. There was plenty of food to go around, despite the fact that little John Kostka did his impression of 100 flesh-eating beetles, devouring everything in his peripheral vision range. A growing boy needs his strength.

Lunch was followed by a slide presentation on the black caiman, and then another on timber rattlesnakes, plus a video on the Cuban crocodile, all of which the zoo is working with in conservation projects. On previous zoo trips, we have never been welcomed like this, with such a friendly reception on a grand scale. Afterward, we boarded a tram (like a giant centipede with wheels, minus the antennae and mandibles) for a tour of the entire zoo grounds.

Then it was off to the Herpaquarium (reptiles and fish) for a more personalized tour behind the exhibits. If you've never been behind the scenes at the zoo, there are usually animals back there, many of which are not on exhibit. Snakes, lizards, turtles and crocodilians abound in every nook and cranny. Of course the species that caught my eye was *Cordylus giganteus*, the South African sungazer. The zoo had three of them. One old female (20+ years) and two younger ones, each of which was labeled (0.0.1), meaning that the sex was unknown. Now if there's one thing that I've learned to do, even with my eyes closed, it is to sex sungazers. *Cordylus* species are my specialty. How often does one get to show off a "hidden talent" such as this? Almost never, especially in polite society! My heart leapt wildly at the possibility to, without question, set the zoo records straight. Of course these animals can never just be

out in the open. The first unsexed lizard was in a metal cattle trough, buried inside a PVC pipe unit and had to be "persuaded to leave its confines." Male sungazers have raised, callous scalation on the inside part of their front legs, which is very pronounced. The one I had just picked up was a female. The other lizard in question was on display in an upstairs enclosure. As our behind the scenes tour was winding down, I proceeded to find the head keeper, Becca Abrams, to get access to sex this sungazer. This one too was wedged in PVC pipe and had to be "wrangled out." At this point, Becca donned thick leather gloves to try and remove it tail first. If you've never been exposed to a sungazer's tail, it is their main line of defense, whipping it hard enough to break one's skin and draw blood. After a bit, working in tandem, we had this one in hand. Would this one be a male? A quick examination revealed . . . another female! Just as well, for if there is one type of lizard that is extremely hard to breed, it's these guys! If anyone has had continued success breeding sungazers, outside of South Africa, I'd like to know about it.

After discussing *Cordylus* lore for the next 20 minutes, I realized, looking around, that everyone else in my group had disappeared. During my sungazer experience, I kind of went into a hazy, lizard-like trance and was just now coming out of it. The task at hand was to find some of my traveling companions, now scattered amidst the zoo wildlife, like gibbons in the tree tops, swinging from branch to branch. How long would it take? How long, indeed!

To be continued . . .

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Herpetology 1999

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

BLACK TREE MONITOR FEEDING BEHAVIOR

R. W. Hartdegen et al. [1999, Amphibia–Reptilia 20(3): 330-332] examined the effects of prey size and movement on the feeding behavior of captive black tree monitors, *Varanus beccari*. Three experiments were conducted: in experiment 1 the basking lamps were turned on and the prey was offered alive; in experiment 2 the basking lamps were turned off and the prey was offered alive; in experiment 3, basking lamps were turned on and prey was offered dead. Three sizes of prey were offered, including adult crickets (*Achela domestica*, $\bar{x}$= 0.43 g, s = 0.08 g), newborn mice (*Mus musculus*, $\bar{x}$ = 2.6 g, s = 0.9 g), and newborn rats (*Rattus norvegicus*, $\bar{x}$ = 20.6 g, s = 2.1 g). Prey was placed on the terrarium floor at random times during the day, and the exact location at which the prey was swallowed by the lizard was recorded. More prey was eaten at perch sites (76% of the 125 prey items) than on the cage floor (24%). Lizards moved to perches regardless whether the basking lamp was turned on or off (64 times versus 60 times: (χ^2 = 0.02, df = 1, P > 0.05). Large, live prey were more likely to be carried to a perch for consumption (χ^2 = 5.83, df = 1, P < 0.05) than small live prey. Newborn rats were carried to a perch site more often than live crickets or newborn mice. Newborn rats were taken to perches regardless whether they were live or dead (χ^2 = 2.37, df = 1, P > 0.05). Prey activity also affected perch use. Live crickets and newborn mice were taken to perches 81% of the time; dead ones were taken to perches only 38% of the time. Carrying a large moving prey to a perch site might be considered an antipredator tactic, reducing exposure to predation, or a tactic for reducing intraspecific kleptoparasitism (food stealing). On several occasions the authors witnessed cagemates stealing food from each other's mouths, but this behavior might be an artifact of captivity. Its occurrence in the wild still needs to be studied, as the social behavior of the *V. prasinus* complex in the wild is very poorly known.

GREEN FROG HIBERNATION

V. S. Lamoureux and D. M. Madison [1999, J. Herpetology 33(3):430-435] note that anecdotal accounts from chance encounters with overwintering anurans predominate in the literature. There have been few systematic studies detailing overwintering habitats in anurans. The authors used radio implants to determine overwintering habitats of the green frog, *Rana clamitans*, in southern New York State. They report on 23 frogs tracked up to 38 weeks during 1995–1997. Green frogs made extensive movements in late fall away from summer breeding ponds primarily to areas of flowing water in streams and seeps. The authors suggest that these sites are chosen because they remain unfrozen and provide adequate oxygen for survival. The seasonal shifts in habitat preference we observed have important implications for amphibian and wetland conservation.

TIMING OF BARKING TREEFROG CHORUSES

C. G. Murphy [1999, Copeia (2):33-347] examined the timing of chorusing within a night by male barking treefrogs, *Hyla gratiosa*. Males arrived at breeding ponds earlier each night than did females, and nearly all males continued calling until after the last female had arrived. The amount of time that males spent in the chorus within a night was correlated with the timing of male and female arrival and the number of males calling in the chorus, although these three variables accounted for relatively little of the variance in time spent in the chorus. There was little support for the hypothesis that the amount of energy available to males influenced the time that males spent in the chorus each night. The amount of time that males spent in the chorus within a night was not correlated with their conditions, and experimental feeding of males had no discernible effect on the number of hours that males spent in the chorus, despite the fact that previous work demonstrated that feeding increased the number of nights that males call. Early-arriving males had higher nightly probabilities of mating than did late-arriving males, but there was no relationship between mating success and the amount of time that males spent in the chorus within a night. These results suggest that males cease calling relatively early in the night not because they run out of energy but because females cease arriving at the chorus relatively early in the night.

AGE STRUCTURE IN WOOD FROG POPULATIONS

E. S. Sagor et al. [1998, J. Herpetology 32(4):469-474] describe the age structure of a breeding population of *Rana sylvatica* from southwestern Québec, Canada, based on the enumeration and analysis of Lines of Arrested Growth (LAGs) in phalanges. Analyzed using skeletochronology, ages ranged from 1 to 4 yr among 98 males and from 2 to 4 yr among 33 females. Females were on average slightly older than males, but the difference was not significant. Mean snout–vent length was 43.6 mm ± 2.0 (SD) among 179 males and 48.8 mm ± 2.7 among 33 females; the difference between the sexes was significant. Endosteal resorption completely destroyed LAG 1 in 6.1% of frogs, about twice as frequently in males as in females. A minimum of three LAG enumeration readings by two observers differed for 24.4% of preparations and independent readings by the same observer differed for 15.3% of preparations, highlighting the importance of reducing subjectivity in skeletochronological analyses. This was accomplished, in part, by plotting LAG diameters on a histogram whereby outliers from an expected normal distribution indicated loss of inner LAGs via endosteal resorption. Consistent with predictions regarding environmental influences on anuran populations, southern Québec *R. sylvatica* matured later and were larger than more southerly conspecifics from a low-elevation area, but matured earlier and were smaller than southerly frogs from a high-elevation area.

NEW INDONESIAN MONITOR

T. Ziegler et al. [1999, Herpetozoa 12(1/2):45-56] describe *Varanus caerulivirens*, a new species of monitor lizard from Halmahera Island, Moluccas, Indonesia. This species belongs to the *V. indicus* group and is distinguished from the other members of this group (*V. doreanus*, *V. finschi*, *V. indicus*, *V. jobiensis*, *V. melinus*, *V. spinulosus* and *V. yuwonoi*) by the following character combination: a light blue to turquoise tinge in the coloration of head, neck, parts of dorsum, limbs and tail; a high midbody scale count; a pink-colored, light tongue which may have dark pigment only at the tips and/or their bifurcation point; and paryphasmata differentiated only at one side of the sperm groove of the hemipenis and hemiclitoris, respectively. The specific status of *V. caerulivirens* is further corroborated by its sympatry with *V. indicus*. The new species shares derived genital structures with *V. indicus* and *V. melinus*, but final conclusions on the systematic position within the *V. indicus* group seem to be premature since there is indication of still more undescribed taxa in this intensively evolving species group. As a vernacular name for the new species the authors propose "Turquoise Monitor Lizard."

PIGMY RATTLESNAKE FORAGING SITES

E. D. Roth et al. [1999, Copeia (3):772-774] performed a field experiment to test the hypothesis that pigmy rattlesnakes, *Sistrurus miliarius barbouri*, select foraging locations based on the presence of prey odor. They established six pairs of parallel transects, each 25 m long; the experimental transect was sprayed with distilled water in which leopard frogs had been housed for 48 h, and the parallel control transect was sprayed only with distilled water. The transects were then censused for the presence of pigmy rattlesnakes at 24-h intervals for the next 96 h. More snakes were found along the experimental transects at all times, and significantly more ($P = 0.019$, binomial test) were found at 72 h after spraying. These results indicate that prey odor is at least one of the factors involved in foraging site selection by these sit-and-wait predators.

BIPARENTAL CARE IN AN AMAZONIAN TREEFROG

K.-H. Jungfer and P. Weygoldt [1999, Amphibia–Reptilia 20(3):235-249] report that the Central Amazonian treefrog *Osteocephalus oophagus* breeds in water-filled bromeliad or palm tree leaf axils or in treeholes. The larvae feed on eggs provided by their parents; larvae not provided with eggs die. Survival of the larvae is ensured by the fact that the pair always spawns at the same site. They return at intervals of 5 to 7 days. Pair bonding is the rule in areas with low frog densities. The first eggs develop into tadpoles and later clutches of fertilized eggs serve as food. There is no apparent communication system between larvae and mother. After metamorphosis of the larvae the pair continues to lay eggs into the same leaf axils and these eggs also develop into tadpoles. This behavior is compared to that of other frogs that feed their tadpoles on eggs. It seems to be the least advanced mode of parental care involving tadpole feeding and demonstrates one of the initial steps that has led to more complex parental care behaviors in frogs.

KIN RECOGNITION IN HATCHLING ALLIGATORS

K. M. Passek and J. C. Gillingham [1999, Copeia (3):831-835] investigated kin-recognition abilities in hatchling American alligators (*Alligator mississippiensis*) in three separate experiments: association preference, olfactory cue detection, and physical contact tests by examining the relationship between animals that chose to group together. Hatchling alligators preferred to group with other hatchling alligators over remaining solitary or seeking cover near vegetation, but these hatchlings did not necessarily have to be kin. Alligators also did not show a preference for water-borne chemosensory cues of kin over those of non-kin. Alligators spent equal amounts of time with both kin and non-kin, familiar and nonfamiliar animals. These results are discussed in terms of alligator maternal behavior and ecology.

AMPHISBAENIAN ECOLOGY

G. R. Colli and D. S. Zamboni [1999, Copeia (3):733-742] note that very little is known about the ecology of amphisbaenians due to their secretive habits. Based on a large series of specimens from the Cerrado of central Brazil, the diet composition, reproduction, and sexual dimorphism of *Amphisbaena alba* are described. *Amphisbaena alba* displayed a relatively diverse diet, even ingesting vertebrates and plant material. Beetles, ants, and spiders dominated the diet numerically, whereas ants, insect larvae, and beetles were more important volumetrically. No association was observed between prey size and body dimensions. The smallest reproductive male was 422 mm SVL (snout–vent length), and the smallest reproductive female was 457 mm SVL. Clutch size ranged from 8 to 16, one of the largest known for amphisbaenians, and is possibly influenced by the large body size of *A. alba*. Reproduction is apparently seasonal and restricted to the dry season. No intersexual differences were observed, either in morphometric or meristic characters, presumably because of functional constraints related to fossoriality.

SALAMANDER MOVEMENTS

F. Andreone et al. [1999, Herpetozoa 12(1/2):3-10] studied a population of *Salamandra lanzai* in the Cottian Alps (NW Italy) in 1992 (June and September) and 1993 (July). The study area was a moor of about 16,000 m^2 at an altitude of 2,020 m. Estimated population size (capture–recapture method, individual recognition by toe-clipping) was 479 $\pm$ 77 individuals (males 43.5%, females 49.8%, juveniles 6.7%). The capture–recapture distances of the individuals indicate that *S. lanzai* is a quite stationary species. Mean distance (interval 0 to 16 days) was 4.70 $\pm$ 6.02 m (males) and 5.90 $\pm$ 6.82 m (females). Mean velocity of displacement was 2.63 $\pm$ 4.69 m/day in males and 1.74 $\pm$ 2.35 m/day in females. Between sexes, there were no significant differences in these parameters. Furthermore, the influence of weather conditions on the activity of this species was analyzed. In rainy or overcast weather, animals were found during the daylight hours as well as at night, whereas salamanders were much more nocturnal when the weather was clear. In general, windy weather negatively influences the activity of the salamanders.

Unofficial Minutes of the CHS Board Meeting, September 17, 1999

The meeting was called to order at 7:40 P.M. Board member Jennie Picciola was absent.

Officers' and Committee Reports

The minutes of the August Board of Directors meeting were read and accepted.

The Treasurer's report was accepted.

Membership: Current membership is 846, with 12 new memberships coming on forms printed off the CHS website.

Shows: Jenny Vollman reported that the details are being worked out for CHS participation in the grand opening of the Chicago Academy of Sciences Peggy Notebaert Nature Museum.

Web Page: Marcia Rybak presented a handout explaining a website problem that has now been resolved and that she is working on a sample online *Bulletin*.

Adoptions: Rich Crowley reported that the Indianapolis Zoo may still be looking to adopt some iguanas for their collection. He also suggested that members make an effort to take some of the animals up for adoption.

ReptileFest: Lori King reported that Northeastern Illinois University is readying the contract for next year's 'fest. She also mentioned that a discount for the rent may be extended in exchange for science class presentations at the school. Lori informed the board that the editor of *Reptiles* Magazine has promised to consider an article about the 'fest. Sponsorships for ReptileFest were also discussed.

Raffle: Gary Kostka read a sampling of letters from contributors to the raffle. They were Top Hat Cricket Farm, Rainbow Mealworms, and Advanced Vivarium Systems. All company responses were favorable. Marcia Rybak clarified the issue of where raffle items should be sent. To simplify the issue, raffle items should be sent directly to the person in charge of the raffle—Gary Kostka.

Old Business

Jack Schoenfelder, Mike Dloogatch, Ron Humbert and Gary Fogel met with Colin Silvester of the Chicago Academy of Sciences regarding the possibility of moving the CHS meetings to the new Peggy Notebaert Nature Museum. The Academy would like to have us, but our Wednesday night meeting dates would need to be changed, probably to the first Thursday of the month. And the meetings would have to end by 9:30 P.M. Jack will prepare a proposal and submit it to the CAS. A transition committee will be needed if the move is decided upon.

Possible enhancements to the general meetings were discussed, including short presentations, question-and-answer sessions and encouragement of new venders. There will be Christmas shopping at the November general meeting.

Proxy voting for board members not in attendance at a board meeting was discussed. Jack said that in the absence of a rule against it this is acceptable under Roberts' Rules of Order.

New Business

Corresponding Secretary Lori King was given a letter from Randi Scott informing the board of Ms. Scott's wish to will her herp-related possessions to the CHS.

Steve Spitzer read a tentative list of board meeting dates for next year.

Posting of CHS tax returns on the website was nixed in favor of sending them out by E-mail upon request.

Round Table

Steve Spitzer was happy to see such a large turnout at the board meeting.

Lori King reported that Paul Sereno will be running a marathon on October 24 to benefit the Project Exploration educational program. Paul will also be unveiling his new sauropod discovery at a $250/plate dinner at Navy Pier.

Marcia Rybak said that it was nice to see everyone and encouraged all to visit the CHS website.

Jack Schoenfelder announced that a TV program on water monitors, entitled "Thunder Lizard," would air on PBS in October.

The meeting adjourned at 9:40 P.M.

Respectfully submitted by Recording Secretary Karen Bielski

Advertisements

American Federation of Herpetoculturists: A nonprofit national membership organization of herpetoculturists, veterinarians, academicians and zoo personnel involved in the captive husbandry and propagation of amphibians and reptiles. Membership includes highly acclaimed magazine, *The Vivarium*, dedicated to dissemination of information on herpetocultural accomplishments, herp medicine, breeding and maintenance, field studies and adventures, enclosure design and much more. AFH membership is $26. Send information requests to: AFH-News, P.O. Box 300067, Escondido CA 92030-0067.

For sale: rats and mice—pinkies, fuzzies and adults. Quantity discounts. Please send a SASE for pricelist or call Bill Brant, *THE GOURMET RODENT*, 6115 SW 137th Avenue, Archer FL 32618, (352) 495-9024, E-mail <GrmtRodent@aol.com>.

For sale: murine-pathogen-free rats and mice available in all sizes, live or frozen: pinkies, fuzzies, crawlers, small, medium and large. Frozen crawler mice in lots of 2000, $.17 each. Also available, full grown hairless mice. FOB shipping point. Master Card accepted. Call (518) 537-2000 between 8:00 A.M. and 5:00 P.M. or write SAS Corporation, 273 Hover Avenue, Germantown NY 12526 for prices and additional information.

For sale: from **The Mouse Factory**, producing superior quality, frozen feeder mice and rats. New prices, new sizes, and now rats! Our mice and rats are vacuum-packed to greatly extend freezer life by reducing freezer burning and preserving vitamin and nutrient content. We feed our colony a nutrtionally balanced diet of rodent chow, formulated especially for us, and four types of natural whole grains and seeds. Mice: pinkies, $.25; fuzzies, $.30; hoppers, $.35; weanling, $.40; adult, $.45. Rats: starting with pinks at $.40 each, to XL at $1.80 each. Discount prices available. We accept Visa, MC, Discover or money orders. P.O. Box 85, Alpine TX 79831. Call us toll-free at (800) 720-0076 or visit our web site <www.themousefactory.com>.

For sale: from Bayou Rodents, excellent quality feeder mice and rats. Every size available. Pinks starting at $20/100. Orders are shipped by overnight service Monday thru Thursday. We accept Visa, MasterCard and Discover. For more info, contact Rhonda or Peggy, (800) 722-6102.

For sale: **high quality frozen feeders**. Over a decade of production and supply. Seven sizes of mice availabe: small newborn pinks up to jumbo adults. Prices start at $25 per 100. Feeders are separate in the resealable bag, not frozen together. Low shipping rates. Free price list. Kelly Haller, 4236 SE 25th Street, Topeka KS 66605, (913) 234-3358 evenings and weekends.

For sale: Herp bags—colors vary, translucent ripcord nylon, super lightweight, extremely durable construction with hot corners sewn in, double seamed. Custom sizes made upon request. Sizes: 46" × 14", $7 each; 24" × 12", $6 each; 24" × 6", $5 each. Shipping fees, $1 for first bag, $.30 each additional bag. Nicole Lechowicz, 2511 S. Illinois Avenue, #104, Carbondale IL 62901, (618) 457-2783.

For sale: *Rattlesnakes: Their Habits, Life Histories, and Influence on Mankind* by Laurence Klauber, 1st edition, 2 volume set, $250 plus postage; *Keeping and Breeding Snakes* by Chris Mattison (autographed), $25; *Snakes and Lizards, Their Care and Breeding in Captivity* by John Coburn, $20; *Snakes—A Natural History* by A. W. Parker and A. G. Grandison, $15; *Snakes of the World* by Chris Mattison (autographed), $15; *Turtles and Tortoises of the World* by David Alderton, $10; *Turtles of Thailand* by Wirot Nutaphand (autographed), 122 pp., color photos and line drawings of all turtles and tortoises of Thailand, rarely available in U.S., $45. Tom, (480) 967-6265.

For sale: European fire salamanders (*Salamandra salamandra*), c.b., well-started, $30 each. John McGrath, 3815 Evergreen, Columbia MO 65201, (573) 474-8183.

For sale: six female leopard geckos, high yellow, c.b. '99, $25 each or 3/$60; Brazilian rainbow boas, born 8/21/99, gorgeous "terra cotta strain" (Gary Lorio stock), $150–250 according to color and pattern; one yearling female tangerine Honduran milksnake, $65; one yearling male Malaysian blood python, $125. All animals are guaranteed healthy, eating well and properly sexed. Delivery possible (I really hate shipping these critters). Ed or Sue, (607) 264-3441, 6 P.M. – 10 P.M. only, or E-mail: <Paradox1@worldnet.att.net> [NY]

For sale: one male and one female rhinoceros iguanas, *Cyclura cornuta*, $550/pair; one male and one female Burmese mountain tortoises, $400/pair; three c.b. Hermann's tortoises, $425/trio; one male and one female long-term captive Bell's hingeback tortoises, *Kinixys b. belliana* , $80/pair. Leo, (773) 284-8799.

For sale: **Captive-bred *Uromastyx ornatus* and *Uromastyx acanthinurus*—***U. ornatus***, $400; ***U. acanthinurus***, $200—all F_2 offspring, gorgeous, healthy babies from c.b. parents. My third season producing these jewels. Also, c.b. high yellow leopard gecko babies, $20; one male and one female c.b. leucistic leopard geckos (Rainwater bloodline), $100/pair. Audrey Vanderlinden at **Uromastyx Specialties**, (773) 836-2477 or E-mail: <Uromastica@aol.com>.

For sale: '99 c.b. hatchling snakes: Honduran milks, $75; Stuart's milks, $90. Also c.b. baby lizards: bearded dragons, $20–25; leopard geckos, $15–20; *Teratoscincus scincus keiserlingi*, $75. Henry Cohen, 24 St. Johns Place, Buffalo NY 14201, (716) 881-6724.

For sale: black & white California kingnake, $50; brown rat snake, $50; Jalisco (?) milksnake, $50. Eina Schroeder, (847) 390-8974 home, (847) 593-8710 work, (847) 593-8734 fax, E-mail: <mocktertl@mediaone.net>.

For sale: five male and four female **double het snow plains garters** (albino × anerythristic)(*Thamnophis radix*). This is the first year snows were produced and they are awesome! $175 each; four male **possible het snow plains garters**. These are offspring from a het to het breeding and are 66% chance of being het for **snow, albino and anerythristic**, $30 each; three male and one female **het anerythistic red sided garters** (*T. parietalis*). This is an awesome new bloodline that originated in Kansas, charcoal black w/ a gray dorsal stripe and white flecking throughout the body, $200/group. Scott, (919) 934-0110 (EST). [NC]

For sale: Great snakes, great service. Send SASE for list. Applegate, P.O. Box 338, Campo CA 91906, (619) 478-5123. E-mail: <applesnake@juno.com>. Website: <www.applegatereptiles.com> Thank you, call me.

For sale: Sinaloan milksnake hatchlings, $30; three San Gabriel Mountain rosy boas, yearlings, LeShock stock (Amazon Basics), $250/trio; redfoot hatchlings, from cherry head cross, $150. Marc, (815) 293-0989.

For sale: yellow anacondas, c.b. 6/99 from 10' docile female, bright yellow with solid black spots, great eaters, $100 each; male jungle carpet python, stunning 2-year-old, "Lazik" bloodline, $250; black & white banded Cal. kings, $25; 50/50 high white Cal. kings, $50. Mark Petros, Strictly Serpents, (847) 854-3259 home, (847) 854-2992 work.

For sale: Send SASE to CRC, P.O. Box 0731, Las Vegas NV 89125-0731 for brochures and list of species available. Limited bookings available for guided tours of herpetological collection sites in Nevada. Call/fax (702) 450-0065. URL <http://www.herp.com/crc/> E-mail <crcsafetie@aol.com>.

Free to good home: one pair of eastern box turtles. Leo, (773) 284-8799.

Free to good home: two Asian painted frogs. Marc, (815) 293-0989.

Advertisements (cont'd)

Tours: Adventure tours to Madagascar! Join **Bill Love** seeing and photographing fauna and flora, heavily herp-biased, across the world's least known mini-continent. Maximum fun & photo ops assured on every trip. Contact him at: BLUE CHAMELEON VENTURES, P.O. Box 643, Alva FL 33920. TEL: (941) 728-2390, FAX: (941) 728-3276, E-MAIL: <blove@cyberstreet.com>.

Tours: **Road-riding in Costa Rica!** Treat yourself to the trip of a lifetime! Learn about tropical herps, find them, photograph them, see where they live. **Greentracks, Inc.**, offers the best herpetological tours led by internationally acclaimed herpetologists and herpetoculturists. See the Amazon, visit cloud forests, experience the world's greatest rainforest, super sunsets and good company. Call (800) 9-MONKEY.

Wanted: **Reptile/Wildlife Education Instructors**, $15/hour and up (negotiable based on experience), join the highly acclaimed Wildlife Discovery Center featuring Illinois and non-native herps as well as birds of prey (City of Lake Forest, Parks & Recreation Dept.), part time work (weekdays and Saturday classes and programs), must be energetic, flexible, good with kids/parents, knowledgeable about herps (birds of prey a plus as we now have a red-tailed hawk but will train), prior teaching experience a plus, professional and dedicated, thorough training provided. Our primary market is the Lake County area. To apply please call Rob Carmichael, Program Manager, at (847) 615-4388, E-mail: < Carmichr@citylf.lfc.edu> or write to: Rob Carmichael, City of Lake Forest, 400 Hastings Road, Lake Forest, Illinois 60045.

Wanted: Aberrant/unusual garter snakes. Scott, (919) 934-0110 (EST). [NC]

Wanted: big-headed turtles; mata mata turtles; Mexican giant mud turtles (*Staurotypus triporcatus*); exceptionally large common snappers (45 lbs. & up); large alligator snappers (over 90 lbs.); spectacled caiman from Trinidad, Tobago and Surinam; dwarf caiman; smooth-fronted caiman; albino turtles (except red-eared sliders). Walt Loose, (610) 926-6028, 9:00 A.M. – 1:00 P.M. or after 11:30 P.M. Eastern Time.

Line ads in this publication are run free for CHS members — $2 per line for nonmembers. Any ad may be refused at the discretion of the Editor. Submit ads to: Michael Dloogatch, 6048 N. Lawndale Avenue, Chicago IL 60659, (773) 588-0728 evening telephone, (312) 782-2868 fax, E-mail <MADadder0@aol.com>.

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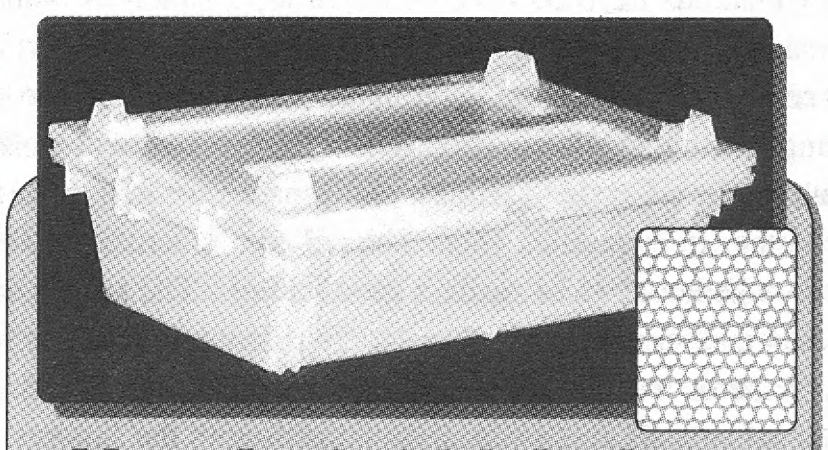

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UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., Wednesday, October 27, at the Field Museum of Natural History, Roosevelt Road at Lake Shore Drive, in Chicago. **Jeff Ettling**, Curator of Reptiles at the St. Louis Zoo, will speak on "Lending a Helping Hand: Cooperative Zoo Efforts to Help Save the Endangered Jamaican Boa." This project has involved a multilevel approach: the teaching of husbandry techniques to Jamaican zoo personnel; field surveys to ascertain the status of the boa in the wild; and an education program aimed at enlightening the Jamaican people as to the endangered status of the boa. The education effort has been partially funded by a grant from the CHS.

The annual election of officers and members-at-large of the CHS Board of Directors will be held at the November 24 meeting. After the elections, **Ron Humbert** will treat us to a selection of slides from past field trips.

We are required to use the entrance on the west side of the museum. **We are allowed to use the free parking lot to the west of the museum. Entrance to this lot is from McFetridge Drive, the wide street just to the south, between the museum and Soldier Field.** Public transportation is an option: the Roosevelt Road (12th Street) bus goes directly to the museum, thus providing a connection with the el and subway. This bus service runs until 11 P.M.

The Chicago Turtle Club

The Chicago Turtle Club will meet on Sunday, October 24, 1:00 – 3:30/4:00 P.M., at the North Park Village Nature Center, 5801 N. Pulaski, in Chicago. Meetings are informal. Questions, children and animals are welcome. Parking is free and there is no admission. For more information call Lisa Koester, (773) 508-0034 or visit the CTC web site: <http://www.geocities.com/~chicagoturtle>.

DONATIONS TO THE AUGUST 25 RAFFLE

The following is a listing of those businesses and individuals who generously donated items for our monthly raffle at the August 25 meeting. The donated items are shown in parentheses.

Timberline (fruit fly culture kit); Zoo Med (Reptisun light/Reptivite vitamins/Reptisafe water conditioner); Four Paws (Naturebark substrate); Super Pet (floating island/Hanging Gardens cage decor/ceramic dish); Aquarium Systems (book—*Damselfishes of the World*); Rep-Cal (bearded dragon food); Fluker Farms (Cricket Quencher/Repta-Lawn natural cage liner); Reptile Emporium (InsectNside candy/Larvets Worm Snax); Ghann's Cricket Farm (cricket gift certificate); Pretty Pets (tortoise food); Sunshine Mealworms (cricket gift certificate); Energy Savers Unlimited (reptile nightlight); Top Hat Cricket Farm (cricket food); Rainbow Mealworms (mealworm gift certificate); Mountain Meadows (Critter Country bedding); Doug Holmes—Habitat Systems (light fixture); Jack Schoenfelder—Reptiques (aquarium and supplies); Lori King (cacti and bromeliads); Marcia Rybak (book—*Encyclopedia of Reptiles and Amphibians*).

MOVING??

Please let us know in plenty of time of any change in your mailing address. The *Bulletin of the Chicago Herpetological Society* is sent to our U.S. members by bulk-rate third class mail. This means that the U.S. Post Office will not forward your *Bulletin* with the rest of your mail. This is so even if you make a special request that your magazines be forwarded (such a request only applies to second class mail).

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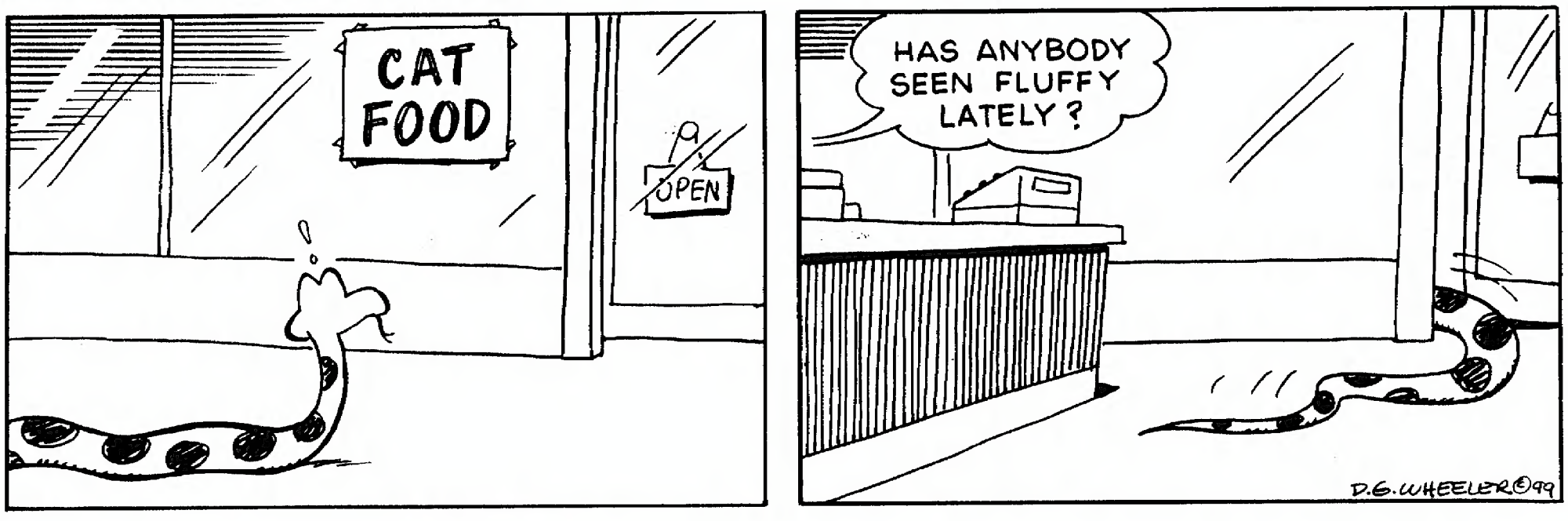

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